LXXXIX. *An Anſwer to Dr.* Lining's *Query relating to the Death of Profeſſor* Richman. *By Mr.* William Watſon, *F. R. S.*

Read July 4, 1754.

DR. Lining's letter of the 14th of January 1754, being communicated to the Royal Society by Charles Pinckney, Eſq; that learned body referred it to Mr. Watſon, one of their members, in order that the beſt information, that could be procured upon this ſubject, ſhould be tranſmitted to Dr. Lining, for whoſe correſpondence the Society had for many years had a very particular attention. Mr. Watſon imagined, that it would be agreeable to Dr. Lining, as his abode is ſo remote from Peterſburg, where the accident happened, to have tranſmitted to him not only the anſwer to what he more particularly requeſts, but alſo as general an account of every thing relating to ſo uncommon an accident, as could be procured.

The deſcription of Profeſſor Richman's apparatus, hereafter mentioned, was ſent by himſelf to Profeſſor Heinſius of Leipſic. He intituled it an electrical gnomon. To the conſtruction of this gnomon were neceſſary a rod of metal, a glaſs jar, a linen thread of a foot and half in length, to one end of which was faſtened half a grain of lead, and a quadrant *. The rod of metal *C D* was placed in the glaſs veſſel *E*, which contained filings of metal. The linen thread *C G* was faſtened to the rod at *C*, and, when the apparatus is not electriſed, hangs perpendicular

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* See the figure annexed, which, with the account of the apparatus, is extracted and tranſlated from a Latin treatiſe of Profeſſor Winkler, tranſmitted to the Royal Society from Leipſic.

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pendicular thereto. The radius of the quadrant, which was divided into degrees, was two lines more than a foot and half in length. And here muſt be added an account of the other part of the apparatus, which was to communicate the electricity to the gnomon during a thunder-ſtorm. Through a glaſs bottle, the bottom of which was perforated, paſſed an iron rod, which was kept in its place, by means of a cork fitted to the mouth of this bottle, through which cork likewiſe was inſerted the iron rod. A tile was removed from the top of the houſe; and upon this opening was placed the bottle, ſupported by the neighbouring tiles, in ſuch manner that one end of the iron rod was not only four or five feet above the top of the houſe; but the other end, which came through the bottom of the bottle, did no-where touch the tiles, or any other part of the houſe. To this end of the iron rod was faſtened an iron chain, which was conducted into the chamber of Profeſſor Richman, upon electrics *per ſe*, ſo as no-where to touch the building. The entrance to this chamber faced the north; and at the ſouth end of it there was a window, near which ſtood a table four feet in height. Upon this the Profeſſor placed his electrical gnomon, and connected it with the chain, which was brought under the ceiling of the room over this table, and communicated with the apparatus on the top of the houſe, by means of a wire *B C*, which hung from the chain, and was joined there to *A B*, by the little ring *B*, and communicated with the rod *D C* at *C*. When the iron rod at the top of the houſe was affected by the thunder, or otherwiſe ſuitable condition of the atmoſphere, the thread beforementioned deviated from the perpendicular; as it would alſo do, if artificially electriſed. The Profeſſor always obſerved a greater aſcent of the thread from artificial electricity than from that from the atmoſphere. By the former, he had ſeen it upon the quadrant deſcribe an angle of above fifty-five degrees, but never above thirty by the latter. In the year 1752, Aug. 9. the apparatus acquired ſo great a degree of electricity from the atmoſphere, that from the end of the rod the electrical flaſhes might be heard at ſeveral feet diſtance. Under theſe circumſtances, if any one touched the apparatus, they felt a ſharp ſtroke in their hand and arm.

Profeſſor Richman ſometimes added to this apparatus a glaſs bottle of water, after the manner of Profeſſor Muſchenbroek *H I*, adapted to a veſſel of metal *I K*, which was placed upon glaſs. The wire from the mouth of the bottle of water *H L*, during the time of the thunder, he cauſed to communicate with *B C*. From this addition he found the electricity from the atmoſphere more vehement than it was without it. This he firſt obſerved on May 31, 1753, when the electrical fire exploded with ſuch a force, that it might be heard at the diſtance of three rooms from the apparatus. On the left hand of the bottle was placed a ſecond electrical gnomon *. When this was made uſe of, the wire of metal *B C*, and the wire *H L*, were connected with *M B L*, a prime-conductor from an apparatus for artificial electricity; *viz.* a glaſs globe, &c. At the ſame time alſo, from the chain *A B* was faſtened a piece of wire *B K*, which was in contact with the veſſel *I K*. By theſe means, when the electrical machine was put in

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* See the figure.

motion,

motion, both the electrical gnomons were electriſed; but this went off in a great meaſure, as ſoon as the motion of the machine ceaſed. By this whole apparatus taken together, Profeſſor Richman obſerved a kind of reciprocation in the effects of electricity: for at firſt, when the electrical machine was put in motion, both the linen threads *C G* and *C G* aroſe with the degrees of their reſpective quadrants. If then the wire *B C* of the right gnomon was touched, the thread *C G* collapſed to the rod *C D*; but the thread on the left ſide continued diverging as before the touch. Then, if the wire *B C* of the left gnomon was touched, then in its turn the thread *C G* at the rod *C D* of the right gnomon collapſed, and the thread of the right gnomon aſcended again. This reciprocation of the aſcending and deſcending of the thread, might be repeated three or four times without exciting the machine anew.

The ingenious and induſtrious Profeſſor Richman loſt his life on the ſixth of Auguſt 1753, as he was obſerving, with Mr. Sokolow, engraver to the Royal Academy at Peterſburg, the effects of electricity upon his gnomon, during a thunder-ſtorm. As ſoon as his death was publicly known, it was imagined that the lightning was more particularly directed into his room by the means of his before-mentioned apparatus. Nor, when this affair was more inquired into, did this opinion appear to be ill-founded: for Mr. Sokolow ſaw that a globe of blue fire, as big as his fiſt, jumped from the rod of the right gnomon *C D*, towards the forehead of Profeſſor Richman, who at that inſtant was, at about a foot's diſtance from the rod, obſerving the electrical index. This globe

globe of fire, which ſtruck Profeſſor Richman, was attended with a report as loud as that of a piſtol. The metal wire *B C* was broke in pieces; and its fragments, thrown upon Mr. Sokolow's cloaths, did from their heat burn marks of their dimenſions thereupon. Half of the glaſs veſſel *E* was broken off, and the filings of metal therein were thrown about the room. From hence it is plain, that the force of the lightning was collected upon the right rod *C D*, which touched the filings of metal in the glaſs veſſel *E*. Upon examining the effects of lightning in the Profeſſor's chamber, they found the door-caſe ſplit half-through, and the door torn off, and thrown into the chamber. The lightning therefore ſeems to have continued its courſe along the chain, conducted under the ceiling of the room; but that it came from the apparatus at the top of the houſe to the door, and then into the chamber, does not, as far as can be collected, appear.

If indeed it could be aſcertained, that the lightning, which was the death of Profeſſor Richman, was collected upon the apparatus, for this reaſon, becauſe theſe bodies, at the inſtant of the lightning, were capable of attracting and retaining the electricity, it would then be in our power ſometimes to divert the effects of lightning. But of this fact, more time and longer experience muſt acquaint us with the truth.

From hence Mr. Pinckney may acquaint Dr. Lining, that, in Mr. Watſon's opinion, at the time Profeſſor Richman was killed, his apparatus was perfectly inſulated, and had no communication with the earth, by the means of metallic or other ſubſtances, readily conducting electricity; and that the great quantity of electricity, with which, from the vaſtneſs of the cauſe, the apparatus was replete, diſcharged itſelf through the Profeſſor's body, being the neareſt non-electric ſubſtance in contact with the floor, and was unfortunately the cauſe of his death. This, it is preſumed, would not have happened, had the chain, or any other part of the apparatus, touched the floor, whereby the electricity would have been readily communicated to the earth.

Since the reading of the above to the Royal Society, a treatiſe in Latin, intituled, *Oratio de Meteoris vi electrica ortis*, by Mr. Lomonoſow, of the Royal Academy of Sciences at Peterſburg, has been tranſmitted to the Society. By this, among many other curious facts, we have been informed of certain particulars in relation to the death of Profeſſor Richman; of which the following may not be improper to be inſerted here.

Mr. Lomonoſow obſerves, that, with regard to the ſudden death of the gentleman before-mentioned, the accounts, communicated to the public, contained ſome circumſtances not fairly ſtated, and others of ſome importance were entirely omitted. With regard to the firſt, it is inconteſtably true, that the window, in the room where Profeſſor Richman was *(a)*, had continued ſhut, that the wind might have no effect upon his electrometer: but that the window in the next room * *(e f d g)* was open, and the door *(d)*, which was between theſe two rooms, was half open; ſo that the draught of air might uſtly be ſuſpected to have followed the direction of the iron conductor of the Profeſſor's apparatus: that this conductor came from the top of the houſe at (*i*), and was continued to (*h*) and (*b*). 2dly, That this conductor was not placed far from that door-caſe, part of which was torn off. 3dly, That at this time no uſe was made of the Leyden bottle, mentioned in the preceding account; but the iron was inſerted into a glaſs ſtand, to prevent the diſſipation of the electrical power, and that the gnomon ſhould ſhew its real ſtrength.

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* See Tab. XXXI. Fig. 2.

With regard to the ſecond, there has as yet been no mention, that Profeſſor Richman, at the time of his death, had ſeventy rubles (a ſilver coin) in his left coat-pocket, which by this accident were not in the leaſt altered. 2dly, That his clock, which ſtood at *(f)*, in the corner of the next room, between the open window and the door, was ſtopped; and that the aſhes from the hearth *(g)* were thrown about the room. 3dly, That many perſons without-doors declared their having actually ſeen the lightning ſhoot from the cloud to the Profeſſor's apparatus at the top of his houſe. A view is likewiſe added * of the chamber, where the Profeſſor was ſtruck by the lightning; who ſtood at *(h)*, with his head projecting towards *(g)* his electrometer; at *(m)* ſtood Mr. Sokolow the engraver; from the door *(c)* a piece was torn off, and carried to (*d*): *(a b)* part of the door-caſe rent.

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* See Tab. XXXI. Fig. 3.

In this treatiſe Mr. Lomonoſow, among other phænomena of electricity, takes notice, that he once ſaw, in a ſtorm of thunder and lightning, bruſhes of electrical fire with a hiſſing noiſe, communicate between the iron rod of his apparatus and the ſide of his window; and that theſe were three feet in length, and a foot in breadth. Effects like theſe no one but himſelf has had the opportunity of obſerving.

XC. *Extract of a Letter from* John Henry Winkler, *Profeſſor of Natural Philoſophy at* Leipſic, *and Fellow of the Royal Society, to* Thomas Birch, *D. D. Secretary of the Royal Society, relating to Two electrical Experiments; tranſlated from the* Latin.

Leipſic, May 22, 1754.

Read July 4, 1754.

I Tranſmit to you, Sir, the account of two electrical experiments, both which I made the preſent year. They are founded upon the famous experiment of Leyden.

On January 8, I ſprinkled a plate of metal with the ſeeds of * club-moſs. To this plate I connected a chain, which communicated with the coating of the Leyden bottle of water. I afterwards ſufficiently electriſed this water to make the artificial thunder, of

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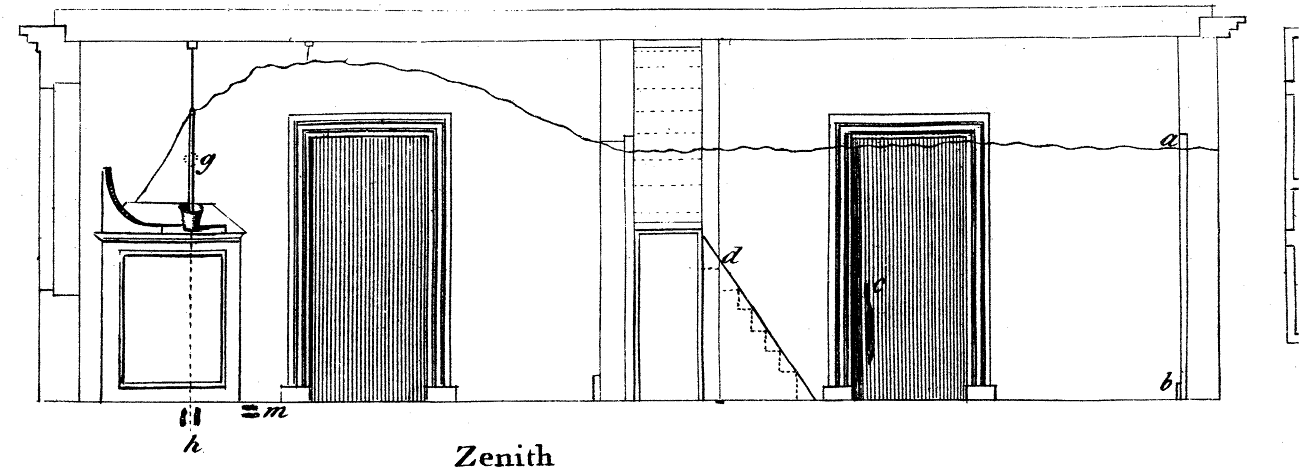
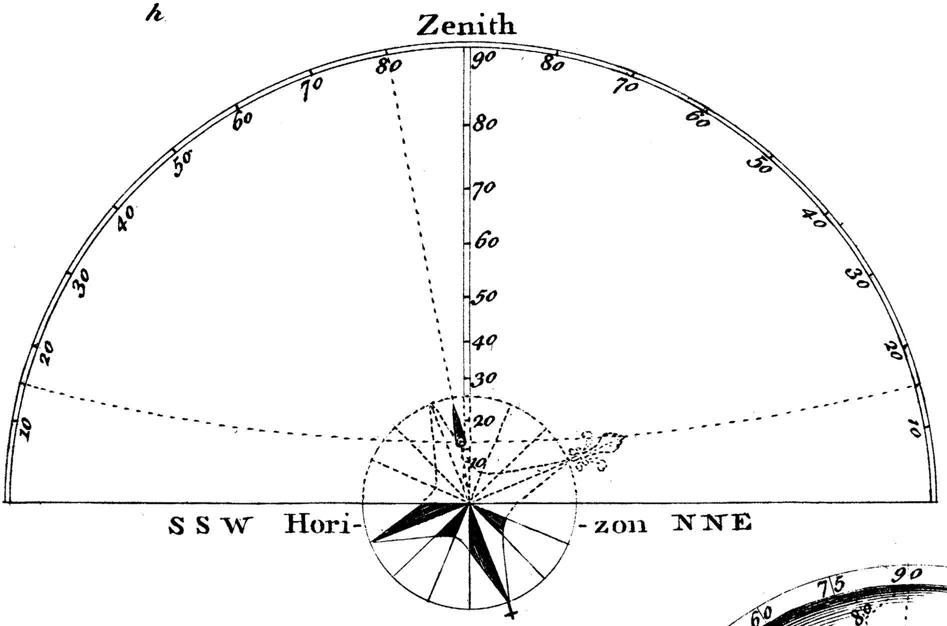
* *Lycopodium*, Club-moſs, Wolf's-claw.

Fig. 3. p. 771.





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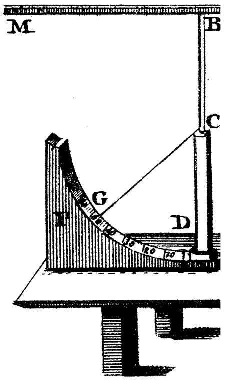

Fig. 3.
p. 775.

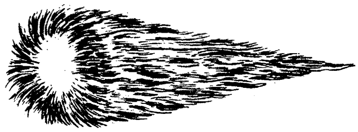

Fig. 1.
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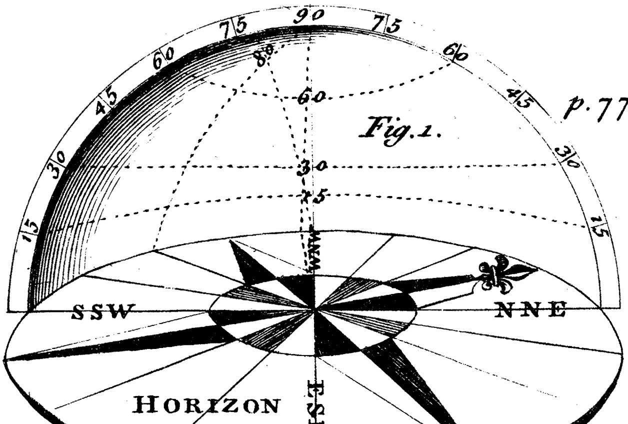


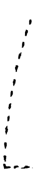


Fig. 2. p. 770.

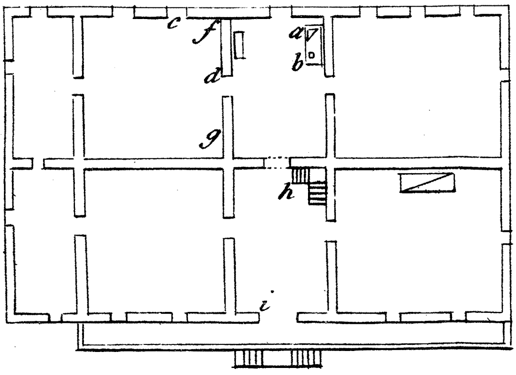
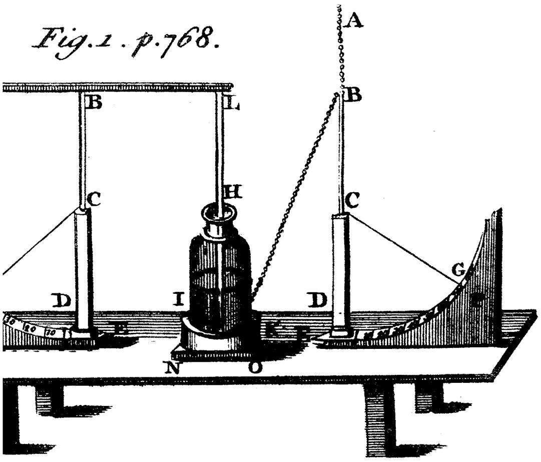


Fig. 1. p. 768.



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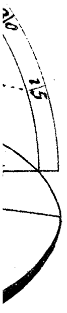

Fig. 2. p. 775.

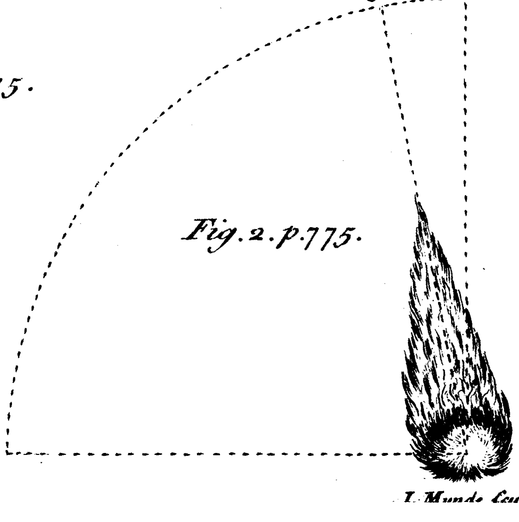

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Fig. 3. p. 771.

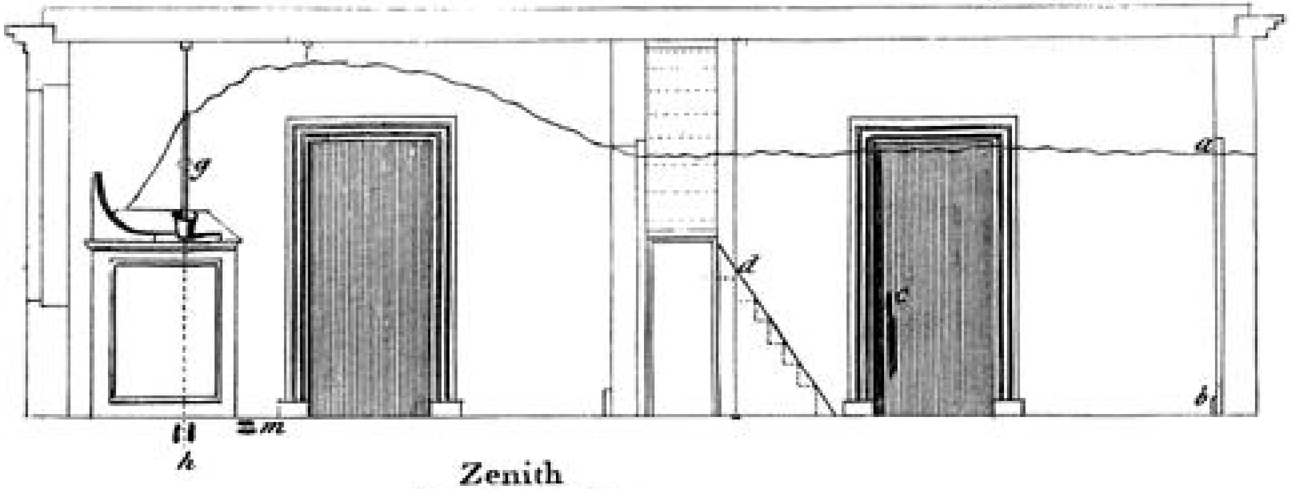
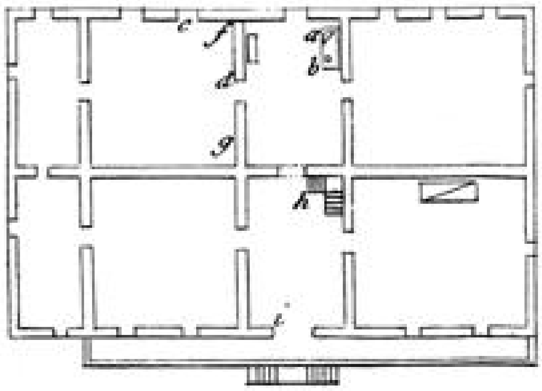


Fig. 2. p. 770.



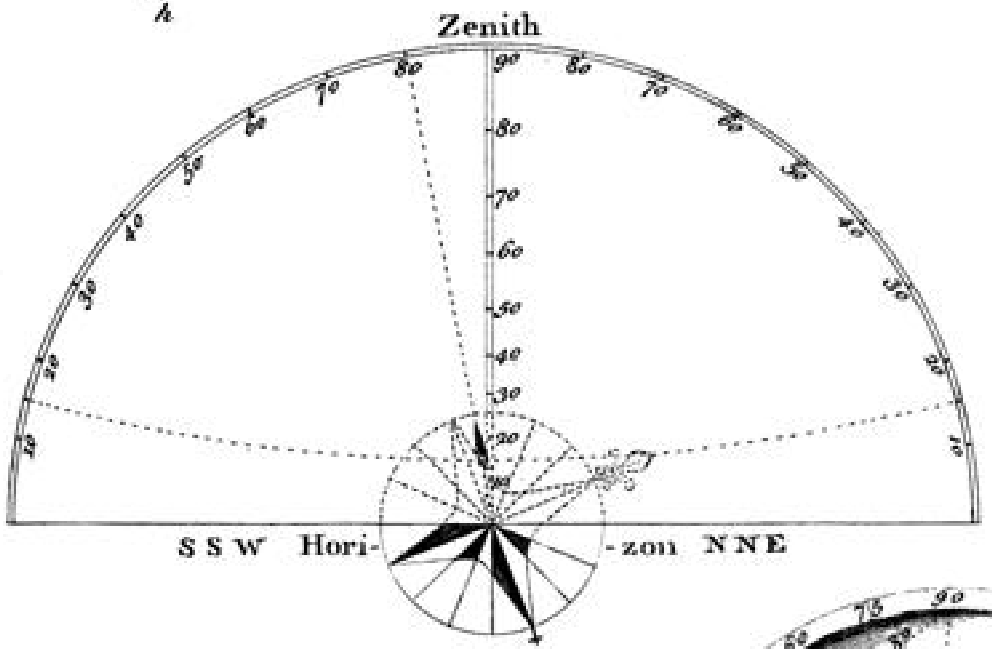
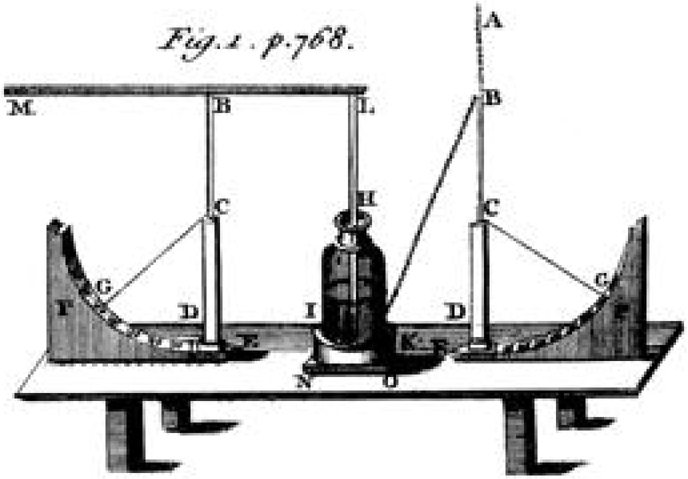


Fig. 1. p. 768.



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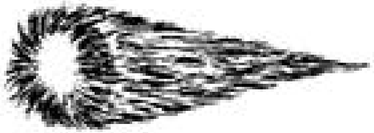

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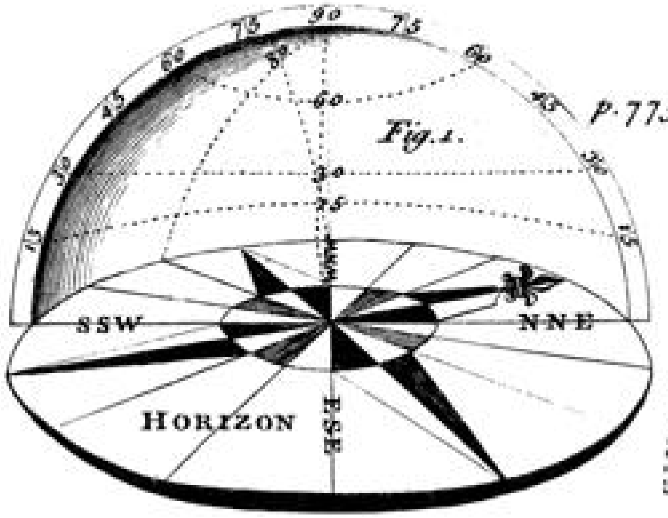
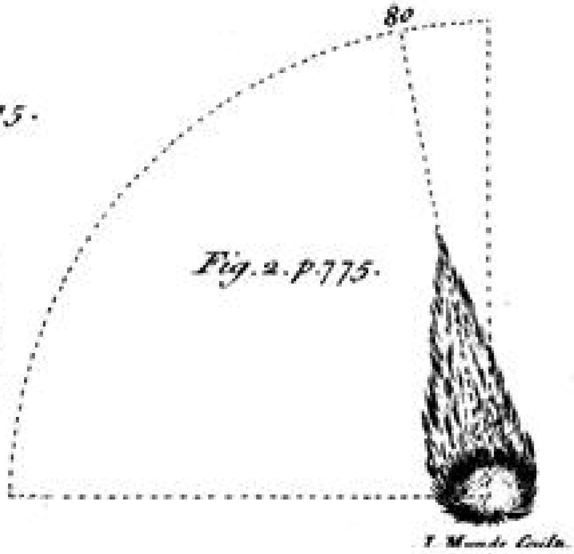


Fig. 2. p. 775.



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